

5.4 Action: Application Rates and Practices

The goal of winter operations is to maintain the specified Level of Service while using the minimum practical amount of chemical. Spreading rates and the timing of application are decisions that need to be made based on variables in weather conditions.

Although there are no firmly set application rates due to these variables, it is feasible for guidelines to be established based on known data. With continued data collection and by performing application rate studies these recommendations can be modified based on experience.

The approach to snow and ice control should be proactive. Therefore, it is recommended that anti-icing be the preferred method of operations when conditions permit. Mechanical removal of snow with proper plow types and cutting edges should be used to ensure adequate cleaning of the roadway prior to secondary chemical application. When applying chemical it is best managed by the use of ground speed oriented spreaders.

Appendix I contains application rate guidelines established by for roads and Appendix J contains application rate guidelines established for parking lots. The recommendations are based on data issued in Appendix B of the New Hampshire DOT Salt Management Plan and are derived from recommendations set by New York State Department of Transportation (NYDOT). They are in chart form with various winter conditions, temperatures, and treatment options for dry rock salt and pre-wet rock salt.

Application rate guidelines for straight liquid salt brine (23 percent concentration of NaCl) chemical are provided in Appendix M. They are based on data issued by the City of Hamilton, New Jersey and are recommended as a starting point, to be adjusted as experience dictates. Caution should be used as over-application of salt brine may cause slippery road conditions.

The following chart is a range of application rates for a variety of treatment options. Data sources are identified next to the recommended rates. The rates should be adjusted depending on various weather conditions and temperatures. In general lower rates are used at warmer temperatures around 28° F - 32° F and higher application rates are used at temperatures below 28° F. For temperatures below 15°F liquid chemical, salt, and prewet may not be beneficial due to chemical inactivity, increased chance of rapid freeze, and application rates that would be too high to be cost effective. Verify your products effective melting temperature prior to application and as a general rule use less chemical if the temperature is rising and more chemical if the temperature is falling.

Table 8. General Application Rates

	Dry Salt (lb.)	Salt prewet with Brine (lb.)	23% Salt Brine NaCl (gal.)	27% Mg Chloride MgCl (gal.)	32% Ca Chloride Mg/Cl (gal.)	Potassium Acetate (Ka)	Calcium magnesium Acetate (CMA) (gal.) / (lb.)	Sand (lb.)
Roads (per/lane mile)	100-450 NYDOT	80-350 NYDOT	30-40 NYDOT	28-30 NYDOT	33-36 NYDOT	10-30 UNH T2	15-25 / 200-400 UNH T2	500-800 NH DOT
	250-300 NHDOT	80-320 MN05	40-60 NHDOT/ UNH T2	15-25 MN05	15-60 UNH T2			400-800 UNH T2
	100-400 MN05/ UNH T2	up to 250 FHWA	20-50 MN05	15-35 UNH T2	25-32 WI			
	100 WI		44 WI	26-33 WI	(89-111 dry per lb.) WI			
	up to 250 FHWA		25-80 NJ	(74-94 dry per lb.) WI				
		25 FHWA						
Parking lots (per/1000 sq.ft.)	3-14 T2	3-11 T2	0.5-0.75 T2	0.1-0.2 MN06				
	0.75-3 MN06	0.75-2.5 MN06	0.2-0.4 MN06					

NYDOT- Highway Maintenance Guidelines Snow and Ice Control 2006
 NHDOT – Winter Maintenance Snow Removal and Ice Control Policy 2001
 MN05- Minnesota Snow and Ice Control Field Handbook for Snowplow Operators 2005
 MN06- Minnesota Winter Parking Lot and Sidewalk Maintenance Manual 2006
 NJ- Hamilton, New Jersey- Implementing an Anti-Icing Policy at the Municipal Level 2007
 T2- University of New Hampshire Technology Transfer Center, Guidelines for Parking Lots 2010
 UNH T2 – Technology Transfer Center Salt Reduction Workshop for Supervisors 2010
 WI- Wisconsin Transportation Bulletin, Pre-Wetting and Anti-Icing, No. 22
 FHWA – Federal Highway Administration, Manual of Practices for an Effective Anti-Icing Program

The most efficient and effective tool for reducing chloride levels without decreasing the level of service is selecting the appropriate time and method of snow and ice removal for each storm.

**NH Road Salt Application Rates for Deicing Parking Lots
(Pounds per 1000 sq.ft.)**

Pavement Temp. (°F) and Trend (↑ ↓)	Weather Condition	Maintenance Actions	Application Rate (lbs/per 1000 sq.ft.)			
			Salt Prewet/ Pretreated with salt brine	Salt Prewet/ Pretreated with other blends	Dry salt	Winter sand
>30 ↑	Snow	Plow, treat intersections only	4.5	4	4.5	Not recommended
	Frz. Rain	Apply chemical	5.75	5.25	6.5	Not recommended
30 ↓	Snow	Plow and apply chemical	5.75	5.25	6.5	Not recommended
	Frz. Rain	Apply chemical	6.5	5.75	7	Not recommended
25 - 30 ↑	Snow	Plow and apply chemical	5.75	5.25	6.5	Not recommended
	Frz. Rain	Apply chemical	6.5	5.75	7	Not recommended
25 - 30 ↓	Snow	Plow and apply chemical	5.75	5.25	6.5	Not recommended
	Frz. Rain	Apply chemical	7	6.5	8.25	10.5
20 - 25 ↑	Snow or frz. Rain	Plow and Apply chemical	7	6.5	8.25	10.5 for frz. Rain
20 - 25 ↓	Snow	Plow and apply chemical	5.75	7.5	9.5	Not recommended
	Frz. Rain	Apply chemical	7	7.5	10	10.5
15 - 20 ↑	Snow	Plow and apply chemical	7.5	7.5	9.5	Not recommended
	Frz. Rain	Apply chemical	8.75	7.5	10	10.5
15 - 20 ↓	Snow or Frz. Rain	Plow and apply chemical	8.25	7.5	10	10.5 for frz. Rain
0 to 15 ↑↓	Snow	Plow, treat with blends, sand hazardous areas	Not recommended	10	Not recommended	13 and spot-treat as needed
< 0	Snow	Plow, treat with blends, sand hazardous areas	Not recommended	23	Not recommended	13 and spot-treat as needed

Table 19. Application Rates for Deicing

These rates are based on road application guidelines (Mn Snow & Ice Control Field Handbook, Manual 2005-1). Develop your own application rates by adjusting your current rates incrementally downward toward these guidelines. Where temperature categories overlap, select the rate most applicable to your situation.

**NH Road Salt Application Rates for Deicing Roads
(Pounds per Lane Mile)**

Pavement Temp. (°F) and Trend (↑ ↓)	Weather Condition	Maintenance Actions	Application Rate (lbs/per lane mile)			
			Salt Prewet/ Pretreated with salt brine	Salt Prewet/ Pretreated with other blends	Dry salt	Winter sand
>30 ↑	Snow	Plow, treat intersections only	150	125	150	Not recommended
	Frz. Rain	Apply chemical	175	150	200	Not recommended
30 ↓	Snow	Plow and apply chemical	175	150	200	Not recommended
	Frz. Rain	Apply chemical	200	175	225	Not recommended
25 - 30 ↑	Snow	Plow and apply chemical	200	175	225	Not recommended
	Frz. Rain	Apply chemical	225	200	225-275	Not recommended
25 - 30 ↓	Snow	Plow and apply chemical	250	200	275	Not recommended
	Frz. Rain	Apply chemical	275	250	275-300	450
20 - 25 ↑	Snow or frz. Rain	Plow and Apply chemical	275	275	275-300	450 for frz. Rain
20 - 25 ↓	Snow	Plow and apply chemical	275	250	300-325	Not recommended
	Frz. Rain	Apply chemical	300	275	325-400	450
15 - 20 ↑	Snow	Plow and apply chemical	300	275	325	Not recommended
	Frz. Rain	Apply chemical	300-375	275-350	325-400	450
15 - 20 ↓	Snow or Frz. Rain	Plow and apply chemical	325	300	350	450 for frz. Rain
0 to 15 ↑↓	Snow	Plow, treat with blends, sand hazardous areas	Not recommended	300-350	Not recommended	600 and spot-treat as needed
< 0	Snow	Plow, treat with blends, sand hazardous areas	Not recommended	350-500	Not recommended	600 and spot-treat as needed

Table 19. Application Rates for Deicing

These rates are based on road application guidelines (Mn Snow & Ice Control Field Handbook, Manual 2005-1). Develop your own application rates by adjusting your current rates incrementally downward toward these guidelines. Where temperature categories overlap, select the rate most applicable to your situation.